



Fall 2002 ✧ Volume 4:2

## The Field Experiment Data Sets at the GES DAAC

by Patricia Hrubciak & Lee Kyle

Field experiments are intensive studies of specific regions for limited time periods. Their aim is to characterize certain segments of the region's environment and to test and compare various measurement schemes. For instance, the Tropical Ocean Global Atmospheres, Coupled Ocean Atmosphere Response Experiment (TOGA COARE) of 1992–93 investigated phenomena associated with ocean-atmosphere interaction in the western Pacific warm pool. The TOGA COARE data set includes satellite data plus data from ship and land based Doppler radars; buoys; low, mid, and high-level aircraft equipped with a variety of sensors; and surface based instruments for in situ observations. The NASA component of TOGA COARE was primarily a campaign to validate the concepts on which the planned Tropical Rain Measurement Mission (TRMM) experiment were based. The various instruments and their teams are commonly from independent institutions and often from more than one country. They join in a coordinated campaign for the specific field experiment, with an agreement to share their results. NASA was one of the sponsoring and funding agencies for the field experiments archived at the Goddard Space Flight Center (GSFC) Earth Sciences Distributed Active Archive Center (GES DAAC).

The GES DAAC opened its field campaign archive in 1994 with data from the TRMM oriented TOGA COARE cam-

paigned of 1992–93. It has most recently archived the TRMM global validation campaigns designed to evaluate the physical assumptions used in the operational post-launch TRMM rainfall algorithms, initialize and validate the cloud resolving models, test latent heating retrievals from TRMM measurements, and evaluate methods to estimate rainfall and latent heating from ground based radars. Begun by the TRMM Office in 1998, the TRMM campaigns were designed as a group, so that specific measurements could be compared between experiments in order to gain insight into the regional dependence of any findings.

TRMM is a joint NASA and National Space Development Agency of Japan (NASDA) mission that launched the TRMM satellite on November 28, 1997, with a unique complement of sensors to remotely observe rainfall throughout the global tropics and subtropics and to estimate its associated latent heating. After a postlaunch checkout period, the TRMM science data sets began in December 1997. The TRMM satellite is still operational and data and information concerning this mission can be found at

<http://daac.gsfc.nasa.gov/hydrology/>

The map on Page 2 shows the locations of TOGA COARE and six of the postlaunch TRMM validation campaigns. The Goddard archive contains data from TOGA COARE and six others: the Tex-

as Florida Underflights, field experiments A and B (TEFLUN A, TEFLUN B); the South China Sea Monsoon Experiment (SCSMEX); the Large Scale Biosphere-Atmosphere Experiment in Amazonia (LBA); the Kwajalein Experiment (KWAJEX); and a seventh field experiment (not shown on the map), the Keys Area Precipitation Project (KAPP) 2002, that was carried out in the Florida Keys.

- TEFLUN A studied precipitation in east Texas in spring 1998
- TEFLUN B was centered in east Florida during the late summer hurricane season of the same year
- SCSMEX, May 1 through August 31, 1998, was a large-scale experiment to study the water and energy cycles of the Asian monsoon regions
- LBA was an international field program designed to further understanding of the climatological, ecological, biogeochemical, and hydrological processes in Amazonia, and the impact of land use change on these processes. The TRMM LBA campaign took place in Brazil from January 1 through February 28, 1999
- KWAJEX, July 23 through September 15, 1999, addressed scientific issues related to the generation of TRMM satellite products over the tropical open ocean

*continued on page 2*



- KAPP 2002, August through early October 2002, had two goals: to investigate the efficacy of the Keys area as a primary Ground Validation (GV) site for TRMM and to extend our knowledge of precipitation shape, size, and number density through the use of NASA's Polarimetric (NPOL) radar and ground based disdrometers in the Keys area.

The third Convection and Moisture Experiment (CAMEX-3), August 6 through September 23, 1998, was a hurricane study run cooperatively with TEFLUN B. Its data are archived at the NASA Marshall Space Flight Center Global Hydrology Research Center. For CAMEX-3 details and data see

<http://ghrc.msfc.nasa.gov/camex3/>

The GES DAAC's campaign complement now stands at ten, and includes seven TRMM related field experiments, an instrument archive for the Moderate Resolution Imaging Spectroradiometer (MODIS) Airborne Simulator (MAS), and the Southern Great Plains (SGP) Soil Hydrology campaigns of 1997 and 1999. The SGP97 and SGP99 campaigns particularly studied the problem of measuring soil moisture using satellite and airborne microwave sensors. The MAS instrument was developed to aid in both the prelaunch and postlaunch validation of the concepts and algorithms used in MODIS data processing. MAS has been extensively used in field experiment studies, but because of the large amount of data it generates and the large size of its data files, most of its data are held in a special archive. The GES DAAC MAS archive contains data from well over a dozen flight campaigns carried out from

1993 on. The latest data presently in our archive was taken in the year 2000. We are ingesting the MAS data into the archive now so it will be available, like TRMM data, through the GES DAAC Web Hierarchical Ordering Mechanism.

### GES DAAC Support of Field Experiments

The GES DAAC's support for a field campaign differs in important aspects from its support of satellite data sets. In particular, field campaign data are inherently nonuniform and require significant adaptation on the part of the archive. The participant complement for a campaign ranges widely—from one to three dozen investigators. Each has his or her own instrument, organizational affiliation, and funding. Many are academics with class schedules to consider and an office staff composed of graduate students with a correspondingly high turnover rate. Some are operating with limited resources and lack the programming staff to tailor their data to archive specifications. Data delivery schedules, formatting, and documentation are all driven by these factors.

This is one of the two P3 NASA aircraft used in field campaigns. The photo was taken by campaign participant Tom Jackson during the SGP97 campaign. Other NASA planes and planes from NOAA, several universities, and other sources frequently participate in field experiments as needed or as they are available.



Planning for data volume also requires flexibility. Campaign data acquisition is sensitive to weather and a variety of logistical problems. Planning for volume is therefore a matter of determining thresholds. Since most campaign data sets tend to be small by data center standards, distribution is mainly from anonymous FTP sites front-ended by Web sites.

During the field experiments the GES DAAC may support the experiment team in various ways including posting campaign schedules and general information on the Internet during the experiment. DAAC staff also work with the science team and its individual members to archive the measured data, and they frequently supply regional and temporal subsets of satellite and weather model data sets for use by the science team. The participating instrument teams come from multiple institutions and at times from several countries. Sometimes the non-GSFC teams send their results to the GES DAAC to be archived and sometimes they archive their results in other places. When the latter occurs, the GES DAAC provides Internet links to the other archive sites.

To help coordinate information exchange among the science team members and to better manage the archive program, GES DAAC personnel often attend science team meetings and occasionally go out to the field where the data are being recorded. Once in a while these field trips can get exciting. One of us (Pat H.) accompanied Dr. Joanne Simpson, the TRMM project scientist, on a trip to Australia during the TOGA COARE campaign. It was a huge

*continued on p.3*

An expanded and updated version of *The Global Scanner* is available on our Web site at

[http://daac.gsfc.nasa.gov/DAAC\\_DOCS/Newsletter](http://daac.gsfc.nasa.gov/DAAC_DOCS/Newsletter)

News of noteworthy events that occur in the interim between publication of this issue and the next will be posted there along with goodies we feel may be helpful to our users. Be sure to visit the site from time to time.



# GES DAAC Contractor Support News

by Lee Bodden & Steve Kempler



November 1, 2002, brought significant changes to the structure and management of the contract groups supporting the GSFC Earth Sciences (GES) Distributed Active Archive Center (DAAC), changes that will continue to improve the services and support provided to our user community. The entire contract support group at the GES DAAC was united under a single contract, with additional scientific support being provided by George Mason University (GMU).

Initially, the Version 0 (V0) System, operational since 1993, fulfilled functional capabilities at the GES DAAC to support ongoing and new missions including AVHRR, UARS, TOMS, TOVS, and SeaWiFS. In 1998, Version 1 (V1) was implemented to archive and distribute TRMM data. The work supporting these early data sets was accomplished using a combination of civil servants and contractors. The support for these missions migrated because of a contract change to our current contractor, Science Systems and Applications, Inc. (SSAI), in December 2000. The staff was able to lay down the foundation for the current GES DAAC and was able to provide reliable and timely support for the users of these early data sets and corresponding data products.

Concurrently, in 1992, the EOSDIS Core System (ECS), housed at the GES DAAC and three other DAACs commenced development. The ECS was being developed to support Landsat, Terra, Aqua, Aura, and several smaller satellites. This group of satellites would be downlinking tremendous amounts of data that would be processed in ECS. In addition to the V0/V1 staff, an ECS operations staff, managed by ESDIS, took residence at the GES DAAC. The prime contractor for implementing and initial operations of ECS was most recently Raytheon.

The ECS contract expired in October

2002. Currently, the development staff is employed under an extension. This provided the opportunity to unify the DAAC under one set of mission objectives by transitioning the Raytheon operations staff to SSAI. Thus, the V0/V1 tasks were enhanced to include the ECS level of effort under SSAI.

As a result of the dedication and professionalism of the entire GES DAAC staff, mission success was uncompromised and potential risks were mitigated during the transition. Most noteworthy, over 90% of the staff, along with their knowledge, skills, and enthusiasm, were retained. All the contractor staff at the GES DAAC could now share the same mission objectives to the ultimate benefit of the user.

The Goddard Earth Sciences Data and Information Services Center (GES DISC) is composed of the GES DAAC and the Products and Services Cooperative (PSC or "the Co-Op"). The GES DAAC handles the heritage work of assigned processing, archiving, and distributing Earth Science data sets. As shown in the chart, it has four task related sections.

- **Operations** keeps the production lines and the archive running
- **Data Support** makes it easier for our customers to obtain and use DAAC data
- **Science Integration** integrates science processing software delivered by project science teams
- **Systems & Software Engineering** maintains and improves the center's software systems.

The contract sections supporting the four GES DAAC sections are shown at the bottom. Lee Bodden, the SSAI group manager, reports directly to Steve Kempler, Head of the GES DISC, while the six contractor section leaders report technical problems to their respective GES DAAC section leaders. Since the V2 (ECS) operating system is considerably larger than the earlier V0 and V1 systems, there are separate contractor

Operations and Engineering sections for it. An organizational chart is provided on Page 4.

For more details see "The GES DAAC, How It Works" in the summer 1999 issue of the Global Scanner (of course, there have been personnel changes since then). The Co-Op is responsible for developing new products and services in cooperation with and support of the Earth science data community. Various members of the GES DAAC work on Co-Op projects under separate funding. For further details concerning the Co-Op see the Global Scanner articles "Evolving the NASA Earth Sciences Enterprise (ESE) Data Center" (summer 2000 issue) and "Partners II" (winter 2002 issue).

References in earlier Global Scanner issues describing the structure and tasks of the GES DAAC and Co-Op are available as PDF documents at

[http://daac.gsfc.nasa.gov/DAAC\\_DOCS/Newsletter/](http://daac.gsfc.nasa.gov/DAAC_DOCS/Newsletter/)

Scroll down and click on the issue of interest.



## The Field Experiment Data Sets at the GES DAAC continued from page 2

international campaign (15 participating nations) with all the bells and whistles—a lot of aircraft, ships, buoys, surface instrumentation in the Solomon Islands. It focused on the tropical southern ocean north of Australia, the most data sparse region on the planet. At Dr. Simpson's insistence, we flew through an exciting double headed hurricane (Oliver) in the NASA DC-8 where our "hosts" were kind enough to lay us a smorgasbord, and we dined with our heads brushing the ceiling and our sandwiches dancing lightly on our palms. We experienced a new "proof" of pilot truth that is habitually discounted by scientists—icing in the midst of a tropical storm that caused the aircraft to lose pressure. When the oxygen system failed to deploy we had a scintillatingly abrupt descent from our chosen altitude to one where we inconsequential life forms would be more easily sustained.

For much more information about Field Campaigns and to obtain data go to

<http://daac.gsfc.nasa.gov/fieldexp/>



# GES DAAC News

## New Data Products General News People in the News



### NEW DATA PRODUCTS & SERVICES

Detailed information about the archived data holdings at the GES DISC can be found at

<http://daac.gsfc.nasa.gov>

In this section we emphasize important new happenings concerning our data holdings. These are arranged by data categories.

### NEW TOOLS & FACILITIES FOR GES DAAC DATA USERS

#### DATA POOL OPERATIONAL

Remember that the Data Pool is operational for easy access to most recent

data. It's available from the GES DAAC WHOM online ordering system and through anonymous ftp at

<ftp://g0dps01u.ecs.nasa.gov/>

The URL may change in the near future, so if the one given above doesn't work, send eMail to MODIS User Services at [daac\\_usg@gsfcsrvr4.gsfc.nasa.gov](mailto:daac_usg@gsfcsrvr4.gsfc.nasa.gov) or call 301-614-5304.

### GES DISC PRINCIPAL DATA SETS

#### HYDROLOGY

*Global precipitation, its variability, and associated latent heating, important modeling and applications.*

**TRMM Data**—A new experimental Tropical Rainfall Measuring Mission (TRMM) real-time multisatellite precipitation data set contains three 0.25° gridded products providing merged microwave (3B42RT 3-hourly), microwave-calibrated infrared (IR) (3B41RT), and combined microwave-IR (3B40RT 3-hourly) estimates of precipitation on quasi-global grids, computed in near real time starting late January 2002. The data set can be accessed from

<ftp://aeolus.nascom.nasa.gov/pub/merged/>

For exploration, analyses, and visualization of the 3B42RT product see the TRMM analysis system at

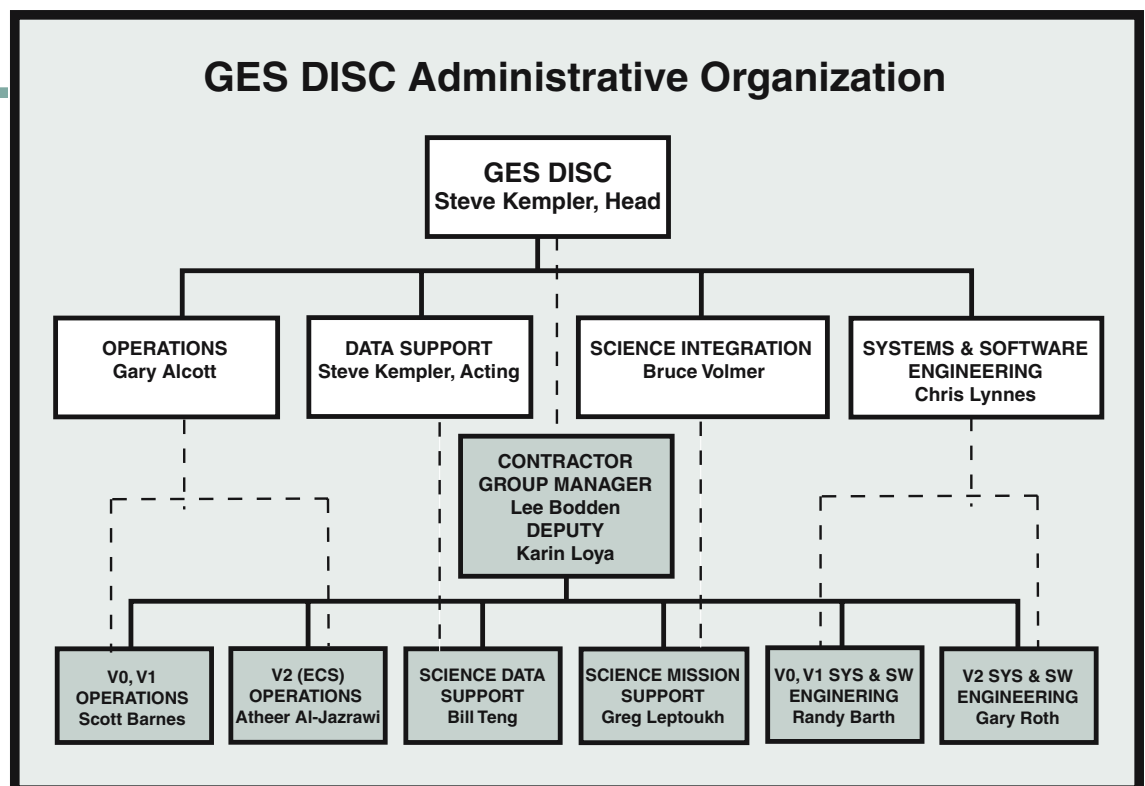
[http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/hydrology/TRMM-analysis.html](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/hydrology/TRMM-analysis.html)

### MODIS DATA SUPPORT

*Radiance data and auxiliary information such as geolocation and cloud mask, atmospheric profiles, and higher level ocean color data*

**Data Ordering Made Easier**—The MODIS Data Support Team (MDST) developed and offers a new portal to MODIS data that allows users to simultaneously order multiple Levels 1 & 2 products. From that single portal a user can check the satellite overpass and cloud cover and in one easy step order sea surface temperatures, chlorophylls, atmospheric aerosols, and geolocations. The portal uses WHOM tables to execute the search and place the order.

GES DAAC Contractor Support  
News, continued from page 3



## MODIS AQUA PRODUCTS NOW AVAILABLE

**Level 1 and Cloud Masks**—The GES DAAC has released Level 1 and cloud mask products from the MODIS onboard the Aqua satellite. The presently available data include raw radiances, geolocation fields, and cloud mask and spectral test results. Recent MODIS Aqua data are now available from the GES DAAC Data Pool,

<ftp://g0dps01u.ocs.nasa.gov>

**MODIS Aqua Ocean Data Released**—The Ocean data from the second MODIS instrument onboard the Aqua satellite has been released. Important details are as follows:

1. MODIS Aqua Sea Surface Temperature (SST) data are with Validated Maturity right at the release time. For now, Provisional Maturity is only at the daytime 4  $\mu$ m SST (sst4), and it is not produced at Level 3.
2. MODIS Aqua Ocean Color data are with Provisional Maturity. The current release of MODIS Aqua Ocean Color data is Collection Version 3, and the public availability is as follows:
  - Daily products (Level 2 and 3) starting with November 29, 2002, (Day 333)
  - Weekly (8-day) products (Level 3 and 4) starting with December 3, 2002, (Day 337)
  - Monthly products (Level 3, to be produced) starting with December 2002.

For further details, a list of products, known problems, and data ordering please visit

<http://modis-ocean.gsfc.nasa.gov> and <http://daac.gsfc.nasa.gov/MODIS/Aqua/>

**Remember:** Extensive periods of available MODIS Terra Atmosphere and Ocean Color data and sea surface temperatures (SST) are of Validated Maturity.

## OCEAN COLOR

*Remote sensing ocean color data used to investigate ocean productivity, marine optical properties, and the interaction of winds and currents with ocean biology.*

**New Search Engine Installed**—The GES DAAC Ocean Color Data Support Team (OCDST) created an attribute search engine for SeaWiFS level 1A High Resolution Picture Transmission (HRPT) station data files, which are the highest resolution (1km) data files for the SeaWiFS mission. This search engine allows criteria filtering for files containing large ocean areas and for files with reduced cloud cover over the ocean.

**Good News**—The contract between NASA and Orbimage, Inc., for data from SeaWiFS has been extended 1 year to December 20, 2003.

## UPPER ATMOSPHERE

*Ozone and other trace gas compositions, dynamics and energy interactions of the upper atmosphere.*

(James Johnson report, 24 Oct 2002)—

Over the summer I had been in contact with Ellis Remsberg down at Langley, who is the current PI for the Nimbus-7 LIMS (Limb Infrared Monitor of the Stratosphere) data. We currently have LIMS data we inherited from NSSDC that are available as offline products on 8mm tape (three of them: LAIPAT, LAMAT, and LASMAT). But Ellis Remsberg's team has gone back and reprocessed the LIMS data to a version 6. These data have improved spatial and vertical resolution and have better precision and accuracy. What we received in July and August are the level 2 retrieved profiles of temperature, geopotential height, O<sub>3</sub>, H<sub>2</sub>O, HNO<sub>3</sub>, and NO<sub>2</sub> (it replaces LAIPAT). The data are available as a seven disk set on CD-R media, or they can be downloaded via anonymous FTP. To obtain these data go to

<http://daac.gsfc.nasa.gov/data/dataset/LIMS/>

or

<ftp://daac.gsfc.nasa.gov>

and change directory to /data/lims. LIMS data cover the 7-month period from 25 October 1978 to 28 May 1979.

**Upcoming**—The SORCE mission successfully launched on January 25, 2003. SORCE stands for Solar Radiation and Climate Experiment, and the satellite has 4 instruments: TIM (Total Irradiance Monitor), SIM (Spectral Irradiance Monitor), SOLSTICE (Solar Stellar Irradiance Comparison Experiment, successor to UARS SOLSTICE) and XPS (XUV Photometer System, similar to the XPS component of the SEE instrument aboard TIMED satellite). We will archive level 0 raw data, level 3 solar spectral irradiance data averaged daily and also every 6 hours, and level 3 total solar irradiances averaged daily and also every 6 hours in the ECS system. The SORCE data will be using the new HDF5 file format! A possible level 4 model product may also be archived in the future. Recent news concerning the SORCE experiment can be found at

<http://lasp.colorado.edu/sorce/>

Researchers may also find useful products in our other important data set collections.

## ATMOSPHERIC DYNAMICS

*3-dimensional dynamic and thermodynamic state of the Earth-atmosphere system, from satellite measurements and assimilation systems.*

## FIELD EXPERIMENTS

*Aircraft and ground based measurements of meteorological variables designed to improve science algorithms and validate satellite-derived data products.*

## INTERDISCIPLINARY

*Global land, ocean and atmospheric parameters mapped to uniform spatial and temporal scales for basic research and applications studies.*

## LAND BIOSPHERE

*Long time-series vegetation and thermal infrared brightness temperature data sets for global change research.*

For more details about the GES DISC data holdings and to order data see our Home Page or contact us by eMail, phone, or fax.

<http://daac.gsfc.nasa.gov/>

For MODIS User Services

eMail: [daac\\_usg@gsfcsrvr4.gsfcmo.ocs.nasa.gov](mailto:daac_usg@gsfcsrvr4.gsfcmo.ocs.nasa.gov)

phone: 301-614-5473

fax: 301-614-5304

For other products' User Services

eMail: [daacuso@daac.gsfc.nasa.gov](mailto:daacuso@daac.gsfc.nasa.gov)

phone: 301-614-5224 or 1-877-422-1222

fax: 301-614-5304

## GENERAL NEWS

### SORCE Is Up!

On Saturday, January 25, a Pegasus aircraft-launched rocket successfully placed the Solar Radiation and Climate Experiment (SORCE) satellite in orbit. The first in-orbit contact was made about 1:27 pm MST. As of 6 pm on the 25th, all spacecraft commissioning activities were proceeding as planned and on schedule. All onboard subsystems reported nominal conditions. The GES DAAC will archive some of the important solar measurements taken by this satellite—see previous column for more details.

*continued on p. 7*



## Contractor News

On November 1, 2000, the entire contract support group at the GES DAAC was united under a single contract with SSAI, with additional scientific support being provided by George Mason University (GMU). However, the ECS enhancements and hardware and software maintenance remains with ECS and follow-on EMD contractor. For further details see the Bodden and Kempler article "GES DAAC Contractor Support News" in this issue.

## Systems Execution Report

Over 1 Pbyte ( $10^{15}$  bytes) of data are archived in ECS thus far. Over 40 Tbytes ( $10^{12}$  bytes) of TRMM, SeaWiFs, CZCS, TOMS, TOVS, UARS, and AVHRR data are archived thus far.

SORCE Operations Readiness Exercises were completed.

MODIS Operations—overall average Terra MODIS production performance for December was at 5.32X, up from 4.85X in November; for Aqua MODIS the December rate was at 1.07X, compared to 1.10X in November. Here X is the production rate required to process the average data stream from the specified instrument. The higher Terra MODIS processing rate allows the concurrent processing of incoming data and the reprocessing of the archived data.

## System Engineering Report

Funding was obtained from Ames for further research into the use of machine learning for data management.

## Data Support Report

The GES DAAC continued support of the U.N. World Food Programme by providing imagery and text to the latest WFP El Niño Bulletin (01/03/03). Acknowledgment to the GES DAAC was given.

## Meetings, Publications, & Presentations

Long Chiu Organized and chaired a tutorial, "New and Future Satellite Systems," at the International Society for Photogrammetry and Remote Sensing (ISPRS) Mid-term Symposium, November 11–15, in Denver. Invited speakers included Vince Salomonson on Aqua.

A collaborative effort between the GES DAAC and the Earth Data Analysis Center (EDAC) at the University of New Mexico led to an image on the cover of the De-

cember 2002 issue of the *Journal of the American Society of Photogrammetry and Remote Sensing*. It featured overlays of MODIS data, TRMM data, and shaded elevation maps. Involved on the DAAC's side were the Hydrology Data Support Team (HDST) staff, with help from John Qu. This was part of the GES DAAC's Remote Sensing Information Partner (RSIP) effort.

James Acker attended the Ocean Optics XVI Conference, November 15–22, in Santa Fe, NM. He took part in two short courses; one on ocean color atmospheric correction (presented by Dr. Howard Gordon) and one on basic ocean optical relationships (presented by Dr. Annick Bricaud).

Four papers were submitted for review to *Advances in Space Research Journal*.

1. "Terra and Aqua MODIS Products Available From NASA GES DAAC," A. Savtchenko, D. Ouzounov, S. Ahmad, J. Acker, G. Leptoukh, J. Koziana, and D. Nickless.
2. "GES DAAC Tools for Accessing Terra and Aqua MODIS Data," D. Ouzounov, A. Savtchenko, G. Leptoukh, B. Zhou, and D. Ostrenga of the GES DAAC and C. Deroo and L. Gonzalez of the Laboratory of Atmospheric Optics, University of Science and Technology, Lillie, 59655 Villeneuve d'Ascq Cedex, France.
3. "Mid-Infrared Emission Prior to Strong Earthquakes Analyzed by Remote Sensing Data," Dimitar Ouzounov and Friedemann Freund.
4. "Atmospheric Products From Upper Atmosphere Research Satellite (UARS)," Suraiya P. Ahmad, James E. Johnson, and Charles H. Jackman (accepted for publication).

## Six From the GES DAAC Attend Fall AGU Meeting

Sunmi Cho, Chris Lynnes, Dimitar Ouzounov, Long Pham, Carrie Phelps, and Suhung Shen represented the GES DAAC at the American Geophysical Union Fall 2002 Meeting held December 6–10 in San Francisco. Sunmi and Carrie also attended the HDF workshop that took place in San Francisco just before the AGU meeting, where James Johnson presented a tutorial on the GES DAAC Web Hierarchical Ordering Mechanism (WHOM)—the DAAC uses HDF format to archive data. Two new employees, Arun Gopalan and Donglian Yuan, also attended the workshop but, like James, they did not stay for the AGU meeting.

The GES DAAC booth at the AGU meeting focused on AIRS and MODIS missions. Nine papers were also presented (presenters are identified by asterisks).

- "Machine Learning Techniques for Decision Support in Intelligent Data Management," C. Lynnes\*, J. Miller, H. Ramapriyan, D. Isaac, & R. Harberts.

- "Ocean Color and Sea Surface Temperature Data from the NASA GES DAAC: From Heritage to Heuristics," A. Savtchenko\*, J. Acker, S. Shen, & D. Ouzounov.
- "GES DAAC HDF Data Processing and Visualization Tools," D. Ouzounov\*, S. Cho, J. Johnson, J. Li, Z. Liu, L. Lu, N. Pollack, J. Qin, A. Savtchenko, & B. Teng.
- "AIRS/AMSU-A/HSB Data On-Demand Subsetting and Visualization Services at NASA GES DISC DAAC," J. Li, S. Cho\*, D. Sun, J. Qin, & A. K. Sharma.
- "NASA GES DISC DAAC Data Holdings for AIRS/Aqua," S. Cho, C. S. Phelps\*, A. K. Sharma, & J. Qin.
- "New Tool for MODIS Multiple Data Ordering: a Case Study Over Lake Michigan," D. Ostrenga\*.
- "TRMM Online Analysis System," Z. Liu\*, H. Rui, W. Teng, & L. Chiu.
- "Near-Line Archive Data Mining at the Goddard Distributed Active Archive Center," L. Pham\*, R. Mack, E. Eng, & C. Lynnes.
- "Analysis of Temporal Variation of Coastal Cloud Cover From SeaWiFS," S. Shen\*, J. Acker, D. Nadeau, J. Wilding, & C. Lynnes.

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## PEOPLE IN THE NEWS

### Personality Sketch: Peter M. Smith, GES DISC Science Support

Peter joined the government in 1980. Prior to this he was a "beltway bandit" with CSC and SASC working on attitude determination and the TOMS ozone algorithm development task. During the 80s he was with Milt Halem's computer center where he helped users migrate their code from IBM mainframes to the new-on-the-block (then) supercomputers such as the CDC CYBER 205 and the Cray Y-MPs. In those days, FORTRAN was the "lingua franca" and the C programming language was considered a little too Mickey Mouse to be paid much attention. It was deemed not worth investing the money in developing the necessary vectorization or parallelization software utilities to convert a user's C code to versions that could exploit the high performance features of the computer hardware. For FORTRAN users, though, the supercomputers would routinely run their optimized code many times faster than that which could be performed by the IBM scalar hardware.

Peter came to the Goddard DAAC in 1993 and was assigned to the AVHRR processing task where he was charged with setting up the AVHRR multisatellite data processing system—prime products, daily, and 10-day composited global vegetation maps. This was the first algorithm to be run operationally at the DAAC as com-

pared with other data sets that were archived at the DAAC but processed elsewhere. The algorithm was developed under the oversight of Dr. John Townshend (UMD Geography Department) by Mary James's programming group. Both hardware and software were delivered and integrated into the DAAC's computer base-line. Processing times were just too slow and it was necessary to upgrade to more modern and faster computer platforms. An open systems environment was chosen with SGI, DEC, and HP hardware being purchased. This achieved the sought after speedup—12 data days could now be processed in a wall clock day as opposed to just 1. But then a second bottleneck arose. Manual quality checking of the data could not be performed fast enough to keep up with the processing pipeline. An intermediate solution was to throw more manpower at this effort, and many people were drafted as AVHRR quality controllers. The long-term solution was to implement an automatic QC system. Eventually by 1999 all the historical data from 1981–1999 had been processed and the system moved into a near real time processing mode with data being processed and made available to the user within 24 hours of data collection. A third bottleneck, which prevented efficient data distribution, was solved by providing an FTP site with subsetting capabilities. For the data and information about it see

[http://daac.gsfc.nasa.gov/CAMPAIGN\\_DOCS/LAND\\_BIO/GLBDST\\_main.html](http://daac.gsfc.nasa.gov/CAMPAIGN_DOCS/LAND_BIO/GLBDST_main.html)

Data processing for AVHRR ceased at the DAAC in September 2001 because of lack of funding and realignment of data set priorities; notably, the arrival of MODIS data. The current data set spans the 1981–2001 time period and still has many active users (see above URL). Many thanks to all current and previous members of the AVHRR team who had a hand in creating this unique vegetation record.

In 2001 Peter became involved with assisting Chris Lynnes in developing a near real time MODIS Direct Broadcast level 1B data processing system at the DAAC. The raw MODIS data are collected by Patrick Coronado's group (code 935) using an antenna outside Building 28. For daylight data, the antenna collects about 10 to 15 minutes of line-of-sight data around 10:30 a.m. each day. Telemetry data are converted to PDS format by Pat's group and transmitted to the DAAC by FTP. Peter, along with Larry Shotland, helped Chris convert and integrate ECS level 1A and 1B algorithms into a Simple, Scalable, Script-Based Science Processor (S4P) processing system at the DAAC to support the DBS data format. This system has now been fully automated and creates daily MODIS level 1B images of the eastern seaboard covering territory from Canada to Florida and the Atlantic Ocean to the Great Lakes. This S4P system was a trail blazer for the ECS level 1B and data mining S4P systems later implemented at our DAAC. Some description of the S4P is given in "Develop-

ing a Simplified MODIS Processing System" in the winter-spring 2001 issue of the *Global Scanner*.

Peter is currently working with Ms. Tong Zhu on implementing a MODIS Aqua subsetting system for supporting a future mission called CloudSat. The CloudSat satellite is due for launch in April 2004. It will fly in formation with the Aqua satellite and provide 3D cloud structure information. Two years of subset data will be provided to the CloudSat people. The CloudSat mission is being managed by JPL, and the science processing will be performed at Colorado State University. For this mission a large number of MODIS Aqua products are being subsetting using software modeled on the level 1B sub-setter developed here at the DAAC by Andrey Savtchenko. They are

MYD02: At-aperture calibrated and geolocated radiances

MYD03: MODIS Geolocation Fields 5-Min L1A Swath 1km

MYD04: daytime aerosol products

MYD05: precipitable column water vapor amounts

MYD06: cloud top physical parameters

MYD07: Total ozone

MYD35: cloud mask.

Data are both band and spatially subset. One of the challenges in developing this software has been the variety of spatial resolutions used by the various algo-

*continued on p. 8*

cut here

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rithms (250 meter, 1 km, 5 km, and 10 km). These new subsetters will provide the CloudSat scientists with the capability of substantially decreasing the amount of data that they will be required to download and process to study the colocated satellite data overlap periods. For additional product information see

<http://daac.gsfc.nasa.gov/MODIS/Aqua/>

Peter is married with three children. Hobbies include running sailboats aground in the Chesapeake Bay, windsurfing in exotic locales, and making a fool of himself in pickup soccer games on Wednesday afternoons in front of Building 3. He was educated in England and the United States and holds a Ph.D. in physical chemistry.

## A Fond Farewell

to **Bob Mack** who spent 3 years at the GES DAAC working on the DAAC Data Mining System. He has gone back to his ancestral home in Wisconsin.  
... to **A.K. Sharma** who, after several productive years in the Data Support group, left us last September to work for NOAA/NESDIS at their Suitland, MD, location.  
... to **Mark Fuerst** who has done excellent work in the V2 (ECS) Systems & Software Engineering group. He left during the recent contract changeover.

## A Hearty Welcome to GES DAAC Newcomers

Andrew Eye

Arun Gopalan

Bob Howard

Xin-Min Hua

Will Knauss

Karin Loya

Peter MacHarrie

Mike Morahan

Anthony Young

Dongliang Yuan

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